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09/808,018	03/15/2001	David Nister	040000-710	4578

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EXAMINER

SEALEY, LANCE W

ART UNIT	PAPER NUMBER
2671	9

DATE MAILED: 04/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/808,018

Applicant(s)

NISTER ET AL.

Examiner

Lance W. Sealey

Art Unit

2671

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4-10,13-15,20-24 and 28-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30 and 31 is/are allowed.
- 6) ☒ Claim(s) 4-10,13-15,20-24,28 and 29 is/are rejected.
- 7) ☒ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

Art Unit 2671

DETAILED ACTION

Allowed Subject Matter

1. Claims 30 and 31 are allowed. No prior art anticipates or suggests, in a method of preprocessing a sequence of video frames, deleting any frames that differ from a previous adjacent frame by an amount less than the predetermined threshold amount until a calculated total difference exceeds the predetermined threshold amount, said calculated total difference being the sum of the differences between each deleted frame and the deleted frame's previous adjacent frame.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 4, 7-8, 10, 13-14, 20, 28 and 29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa (U.S. Pat. No. 6,600,835).

4. Ishikawa, in disclosing a moving-picture compressing technique, also discloses, with

Art Unit 2671

respect to claims 4 and 13-14, a method for preprocessing a video sequence, the method comprising the steps of: receiving the video sequence (input image device 1, FIG.1); generating a set of views suitable for algorithmic processing (input image device 1, FIG.1; each frame represents a view; the aggregate of the frames is "a set of views"; FIG.2 is a flowchart of the algorithmic processing that occurs on this set of views); and determining a motion estimation between the frames in the video sequence (col.9, ll.43-50).

5. Ishikawa discloses identifying frames as redundant (i.e. identical to the previous frame, deemed a "reference frame" in col.9, l.61 to col.10, l.6) and deleting any frames that are identified as redundant (col.10, ll.30-36; the frame which is identical to the previous frame is essentially deleted from the stream of frames to be encoded because the frame is stored in memory and represented in the stream to be encoded by its header). Ishikawa does not directly disclose identifying a frame as redundant if the motion estimation yields a final correlation coefficient above a predetermined threshold. However, it would have been obvious to a person skilled in the art at the time this invention was made for Ishikawa to disclose these elements because Ishikawa either determines that two frames are identical or how much two frames correlate if they are not identical (col.10, ll.7-14). Therefore, if two frames are identical, the correlation coefficient must be 1.0, and if two frames are not identical, the correlation coefficient must be somewhere between 0 and the highest possible number that is less than 1.0, and the "predetermined threshold" must be the highest possible number less than 1.0.

6. With respect to claim 7, Ishikawa discloses determining shot boundaries of the video

Art Unit 2671

sequence (col.6, ll.12-13—“predetermined number of frames in the frame of data FD”); dividing the video sequence into at least one subsequence of frames, wherein each of the at least one subsequence of frames corresponds to a particular shot in the video sequence (col.6, ll.12-13); identifying redundant frames in the at least one subsequence of frames and deleting from the at least one subsequence of frames any frames which are identified as redundant (col.10, ll.30-36).

7. Concerning claim 8, Ishikawa discloses the shot boundaries provided by the camera which captured the video sequence (col.5, ll.57-62).

8. With respect to claim 10, Ishikawa discloses a video sequence received from a video capture device in real-time at col.3, ll.44-46.

9. Claims 20 and 29 disclose views “suitable for Structure from Motion processing”. Since the Structure from Motion problem involves recovery of a three-dimensional structure from a sequence of two-dimensional frames, Ishikawa discloses a series of two-dimensional frames at col.5, ll.57-62. The other elements of claims 20 and 29 are discussed in the rejection of claims 4 and 13-14 above.

10. With respect to claim 28, Ishikawa discloses a sequence of frames received from a video capture device in real-time at col.5, ll.57-62.

11. Accordingly, in view of the foregoing, claim 4, 7-8, 10, 13-14, 20, 28 and 29 are rendered unpatentable under 35 U.S.C. 103(a) by Ishikawa.

12. Claims 5-6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa in view of Lee et al. (“Lee”, U.S. Pat. No. 6,400,831).

Art Unit 2671

13. Concerning both claims, Ishikawa does not disclose global or local motion estimation. However, Lee discloses both global and local motion estimation at col.3, ll.44-46.

14. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Ishikawa compression with the Lee method of motion estimation. This would facilitate identification of whether a frame is relevant by tracking an object through a video sequence (Lee, col.3, ll.44-56).

15. Accordingly, in view of the foregoing, claims 5-6 are rendered unpatentable under 35 U.S.C. 103(a) by Ishikawa and Lee.

16. Claim 9 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa in view of Ratakonda (U.S. Pat. No. 5,995,095).

17. With respect to claim 9, Ishikawa does not disclose determining shot boundaries by correlating adjacent frames in the video sequence after global motion compensation and identifying, for each pair of adjacent frames, the second frame in the pair as a beginning of a new shot based on the correlation between the frames in the pair. However, these elements are inherently disclosed by the Ratakonda method for hierarchical summarization and browsing of digital video at col.6, ll.60-62 because if $K=1$, that means there is a one-to-one correspondence between shots and keyframes, and the next (adjacent) shot indicates the next frame.

18. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Ishikawa and Ratakonda methods. This would facilitate an effective way of visual interactive presentation of a video summary to a user (Ratakonda, col.3,

Art Unit 2671

11.54-56).

19. Accordingly, in view of the foregoing, claim 9 has been rendered unpatentable under 35 U.S.C. 103(a) by Ishikawa and Ratakonda.

20. Claim 15 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa in view of the Goodman article "Ready for action: five video-capture boards that bring motion video to your PC" ("Goodman") .

21. With respect to claim 15, Ishikawa does not disclose monitoring the rate at which accepted frames are provided to the storage device; and providing an indication to the user of the video capture device to decrease the motion of the camera, if the storage device is unable to process the accepted frames at the current rate. However, these elements are disclosed by the section of the Goodman article concerned with making AVI movies (see "Frame Rates and Window Sizes", second paragraph, p.9).

22. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to combine the Goodman method of monitoring the rate at which accepted frames are provided to the storage device with the Ishikawa compression method. This would avoid time wasted in assembling video files that the storage cannot accommodate (Goodman, "Frame Rates and Window Sizes", second paragraph, first sentence, p.9).

23. Accordingly, in view of the foregoing, claim 15 has been rendered unpatentable under 35 U.S.C. 103(a) by Ishikawa and Goodman.

24. Claims 21-23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa

Art Unit 2671

in view of Wang (U.S. Pat. No. 6,707,852).

25. With respect to claim 21, Ishikawa does not explicitly disclose a data buffer. This is disclosed by the Wang encoding method at col.6, ll.4-5.

26. Therefore, it would be obvious to one of ordinary skill in the art at the time this invention was made for the Ishikawa compression method to feature a data buffer. Data buffers permit the encoder to perform the comparison operations needed to determine the difference between any two frames (Wang, col.11, ll.53-57).

27. The other claims in this rejection will now be considered. Concerning claim 22, Ishikawa discloses a video capture device (input image device 1, FIG.1) .

28. Finally, regarding claim 23, Ishikawa discloses a memory device (3, FIG.1).

29. Accordingly, in view of the foregoing, claims 21-23 have been rendered unpatentable under 35 U.S.C. 103(a) by Ishikawa and Wang.

30. Claim 24 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa in view of Wikipedia, the Free Encyclopedia ("Wikipedia") .

31. Ishikawa does not explicitly disclose flash memory. But Wikipedia's description of flash memory states that NOR flash memory was invented by Intel in 1988.

32. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to incorporate flash memory into the Ishikawa frame manipulation method. Flash memory is suitable for storage of program code that needs to be infrequently updated, such as any module in the Ishikawa compression method.

Art Unit 2671

33. Accordingly, in view of the foregoing, claim 24 has been rendered unpatentable under 35 U.S.C. 103(a) by Ishikawa and Wikipedia.

Response to Remarks

34. The applicants have redrafted the claims in reliance on the examiner's statement in the last Office action that claims 4, 13 and 14 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Unfortunately, the examiner has found some new art to reject the subject matter of claims 4, 13 and 14 of the last Office action—Ishikawa. Ishikawa replaces Wolf, "Key Frame Selection by Motion Analysis," as the primary reference to reject the remaining claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the Office should be directed to the examiner, Lance Sealey, whose telephone number is (703) 305-0026. He can be reached Monday-Friday from 7:00 am to 3:30 pm EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798.

Any response to this action should be mailed to:

MS Non-Fee Amendment

Commissioner for Patents

Serial Number 09/808,018

Page -8-

Art Unit 2671

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or faxed to:

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Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,

Arlington, VA, Sixth Floor (Receptionist).


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